CLAIMS

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- 1. An optical device (100) for converting WDM signals, whose pulses are simultaneous and carried by different wavelengths (λ 1, λ 2, λ 3, λ 4), into an OTDM signal, whose components are carried by the same wavelength (λ 4) and time shifted (t1, t2, t3, t4), which device is characterized in that it comprises:
 - · shifting means (102, 103, 104) adapted to introduce a time shift between the pulses of the WDM signals carried by the optical carriers,
 - modulation means (112, 113, 114) adapted to modify the optical power of the WDM signals,
 - an optical spectral and temporal multiplexer/ demultiplexer (120),
 - a birefringent propagation medium (130) into which the WDM signals are injected in such a manner as to achieve a soliton trapping phenomenon, and
 - absorption means (140) adapted to introduce optical losses into the components of the OTDM signal.
- 2. An optical device for converting an OTDM signal whose components are time shifted (t1, t2, t3, t4) and carried by the same wavelength ($\lambda4$) into WDM signals whose pulses are carried by different wavelengths ($\lambda1$, $\lambda2$, $\lambda3$, $\lambda4$), characterized in that it comprises:
 - absorption means (140) adapted to introduce optical losses into the components of the OTDM signal,
- a birefringent propagation medium (130) into which the OTDM signal is injected in such a manner as to achieve a soliton trapping phenomenon,
 - an optical spectral and temporal multiplexer/ demultiplexer (120), and
- modulation means (112, 113, 114) adapted to modify the optical power of the WDM signals.

3. A device according to claim 2, characterized in that it further comprises shifting means (102, 103, 104) adapted to introduce a time shift between the pulses of the WDM signals carried by the optical carriers.

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- 4. A device according to any preceding claim, characterized in that the shifting means (102, 103, 104) comprise variable delay lines.
- 10 5. A device according to any preceding claim, characterized in the modulation means (112, 113, 114) comprise variable attenuators.
- 6. A device according to any preceding claim,
 characterized in that it further comprises a polarization
 controller at the entry of the birefringent propagation
 medium (130) to encourage the injection of WDM/OTDM
 signals into said propagation medium with a polarization
 at 45° to its main axes.

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- 7. A device according to any preceding claim, characterized in that the absorption means (140) comprise an electro-absorption modulator (MEA).
- 8. A device according to any one of claims 1 to 6, characterized in that the absorption means (140) comprise a saturable absorber.
- 9. A method of converting WDM signals, whose pulses are simultaneous and carried by different wavelengths (λ 1, λ 2, λ 3, λ 4), into an OTDM signal, whose components are time shifted and carried by the same wavelength (λ 4), by means of the device according to any one of claims 1 to 8, which method is characterized in that it comprises the steps of:
 - time shifting the pulses of the WDM signals carried by the optical carriers,

- attenuating the WDM signals in order for them to have different optical powers,
- spectrally and temporally multiplexing the WDM signals,
- injecting the wavelength division multiplex obtained into the birefringent propagation medium in such a manner as to achieve a soliton trapping phenomenon and obtain an OTDM signal, and
- equalizing the optical power of the components of the OTDM signal obtained.

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- 10. A method of converting an OTDM signal, whose components are time shifted (t1, t2, t3, t4) and carried by the same wavelength ($\lambda4$) into WDM signals, whose pulses are carried by different wavelengths ($\lambda1$, $\lambda2$, $\lambda3$, $\lambda4$), by means of the device according to any one of claims 2 to 8, characterized in that it comprises the steps of:
 - attenuating the components of the OTDM signal in such a manner that they have different optical powers,
 - injecting the OTDM signal into the birefringent propagation medium in such a manner as to achieve a soliton trapping phenomenon and recover a wavelength division multiplex,
 - spectrally and temporally demultiplexing the wavelength division multiplex in such a manner as to obtain a plurality of WDM signals whose pulses are time shifted and carried by different wavelengths, and
 - equalizing the optical power of the pulses of the WDM signals obtained.
- 11. A method according to claim 10, characterized in that 35 it further consists in time shifting the pulses of the WDM signals carried by the resulting optical carriers in such a manner as to render them simultaneous.